CLAIMS:

Sub B1

1. A method for transmitting and receiving a pulse train signal, comprising:

generating a plurality of pulse trains, wherein each pulse train comprises at least one pulse having at least one predefined pulse characteristic; and

inserting a time delay between two pulse trains of said plurality of pulse trains, wherein the time delay results in at least one of:

an averaging of the number of coincidences between the pulses of the plurality of pulse trains and pulses of another plurality of pulse trains at a receiver; and

satisfying a received signal quality criterion.

2. The method of claim 1, wherein the received signal quality criterion is at least one of:

a received signal quality measurement that meets a signal quality threshold ; and

a best received signal quality measurement of a plurality of signal quality measurements.

3. The method of claim 1, wherein the time delay is specified by at least one code element of at least one delay code.

4. The method of claim 1, wherein a predefined pulse characteristic comprises at least one of:

a time position,

a pulse amplitude;

a pulse width;

a pulse polarity; and

a pulse type.

5. The method of claim 4, wherein the time position is specified in accordance with a code element of a time-hopping code.

6. The method of claim 5, wherein a delay code comprises one or more code elements that specify time delays to be inserted between any one of:

two time-hopping code periods;

two delay code periods, and

two nested delay code periods.

7. The method of claim 1, further comprising:

measuring received signal quality for a plurality of pulse trains based on at least one inserted time delay;

selecting a received signal quality measurement that satisfies a received signal quality criterion; and

delaying a pulse train by an amount of time equal to a sum of any inserted time delays that satisfy the received signal quality criterion.

Sub B1 8. The method of claim 7, wherein the received signal quality measurement is a function of at least one of a:

Signal strength,

Bit-error-rate,

Signal-to-noise ratio; and

Spectral property of the received signal.

9. The method of claim 7, wherein at least one time delay is inserted when a selected received signal quality measurement falls below a threshold.

10. The method of claim 7, wherein at least one time delay is periodically inserted between two adjacent pulse trains to satisfy the received signal quality criterion.

11. The method of claim 3, wherein the at least one delay code is generated using at least one of:

a designed code generation technique, and

a pseudorandom code generation technique.

12. The method of claim 11, wherein said designed code generation technique comprises at least one of:

a Welch-Costas code generation technique;

a Golomb-Costas code generation technique;

a Quadratic Congruential code generation technique;

a Linear Congruential code generation technique; and

a Hyperbolic Congruential code generation technique.

13. The method of claim 11, wherein said pseudorandom code generation technique comprises at least one of:

a linear congruential pseudorandom number generator technique.

an additive lagged-Fibonacci pseudorandom number generator technique;

a linear feedback shift register pseudorandom number generator technique;

a lagged-Fibonacci shift register pseudorandom number generator technique;

a chaotic code pseudorandom number generator technique; and

an optimal Golomb ruler code pseudorandom number generator technique.

14. The method of claim 11, wherein at least one of a delay code length, a delay code period, and a sum of the time delays specified by code elements of a delay code of a plurality of delay codes is a constant value.

15. The method of claim 11, wherein a sum of the time delays specified by code elements of any delay code of a plurality of delay codes is not equal to a sum of delays specified by code elements of any other delay code of the plurality of delay codes.

16. The method of claim 11, wherein a sum of the time delays specified by code elements of a delay code of a plurality of delay codes is greater than a code period of a time hopping code.

17. The method of claim 3, wherein the at least one code element of the at least one delay code is at least one of:

a time delay value;

a symbol that maps to a time delay value; and

a symbol that maps to a memory location.

Sub B

18. A method for transmitting and receiving a plurality of time-varied signals, comprising:

generating a plurality of time-varied signals, and

inserting a time delay between two time-varied signals of said plurality of time-varied signals, wherein the time delay results in at least one of:

an averaging of the number of coincidences between time-varied signals of said plurality of time-varied signals and time-varied signals of another plurality of time-varied signals at a receiver; and

satisfying a received signal quality criterion.

Sub B1

19. The method of claim 18, wherein time-varied signals consists of:

time-hopping signals;

frequency hopping signals;

time-division multiple access signals;

time-division code-division multiple access signals; and

orthogonal frequency division multiple access signals.

20. The method of claim 18, wherein the received signal quality criterion is at least one of:

a signal quality measurement that meets a signal quality threshold ; and

a best signal quality measurement of a plurality of signal quality measurements.

21. The method of claim 18, further comprising, wherein the time delay is specified by at least one code element of at least one delay code.

22. The method of claim 18, wherein a characteristic of the plurality of time-varied signals is varied in accordance with a code element of a time-varying code.

23. The method of claim 22, wherein said time-varying code specifies a characteristic of the plurality of time-varied signals within a time-varying code period.

24. The method of claim 23, wherein the time-varying code is a delay code having one or more code elements that specify time delays to be inserted between any one of:

two time-varying code periods;

two delay code periods, and

two nested delay code periods.

25. The method of claim 18, further comprising:

measuring received signal quality for a plurality of time-varied signals based on the time delays;

selecting a received signal quality measurement that satisfies a received signal quality criterion; and

delaying a time-varied signal by an amount of time equal to the sum of the time delays that satisfies the received signal quality criterion.

Sub B1

26. The method of claim 25 wherein the received signal quality measurement is a function of at least one of a:

Signal strength,

Bit-error-rate,

Signal-to-noise ratio; and

Spectral property of the received signal.

27. The method of claim 25, wherein at least one time delay is inserted when a selected received signal quality measurement falls below a threshold.

28. The method of claim 25, wherein at least one time delay is periodically inserted between two adjacent pulse trains to satisfy the received signal quality criterion.

29. The method of claim 21, wherein a delay code is generated using at least one of:

a designed code generation technique, and

a pseudorandom code generation technique.

30. The method of claim 29, wherein said designed code generation technique comprises at least one of:

a Welch-Costas code generation technique;

a Golomb-Costas code generation technique;

a Quadratic Congruential code generation technique;

a Linear Congruential code generation technique; and

a Hyperbolic Congruential code generation technique.

31. The method of claim 29, wherein said pseudorandom code generation technique comprises at least one of:

a linear congruential pseudorandom number generator technique.

an additive lagged-Fibonacci pseudorandom number generator technique;

a linear feedback shift register pseudorandom number generator technique;

a lagged-Fibonacci shift register pseudorandom number generator technique;

a chaotic code pseudorandom number generator technique; and

an optimal Golomb ruler code pseudorandom number generator technique.

32. The method of claim 29, wherein at least one of a delay code length, a delay code period, and a sum of the time delays specified by the code elements of a delay code of a plurality of delay codes is a constant value.

33. The method of claim 29, wherein a sum of time delays specified by code elements of any delay code of a plurality of delay codes is not equal to a sum of delays specified by code elements of any other delay code of the plurality of delay codes.

34. The method of claim 29, wherein a sum of the time delays specified by code elements of a delay code of a plurality of delay codes is greater than a code period of a time-varying code.

35. The method of claim 21, wherein the at least one code element of the at least one delay code is at least one of:

a time delay value;

a symbol that maps to a time delay value; and.

a symbol that maps to a memory location.

36. An impulse transmission system for communicating pulses having at least one predefined pulse characteristics, comprising:

an Ultra Wideband Transmitter; and

an Ultra Wideband Receiver;

wherein said Ultra Wideband Transmitter inserts at least one time delay specified by at least one code element of at least one delay code between two pulse trains of a plurality of pulse trains.

37. The impulse transmission system of claim 36, wherein a predefined pulse characteristic comprises at least one of:

a time position,

a pulse amplitude;

a pulse width;

a pulse polarity; and

a pulse type.

38. The impulse transmission system of claim 37, wherein the time position is specified in accordance with a code element of a time-hopping code.

39. The impulse transmission system of claim 38, wherein a delay code comprises one or more code elements that specify time delays to be inserted between any one of:

two time-hopping code periods;

two delay code periods, and

two nested delay code periods.

40. The impulse transmission system of claim 36, wherein:

said Ultra Wideband Receiver measures received signal quality for a plurality of pulse trains based on the time delays and

selects a received signal quality measurement that satisfies a received signal quality criterion; and

said Ultra Wideband Transmitter delays a pulse train by an amount of time equal to a sum of time delays that satisfies the received signal quality criterion.

Sub B

41. The impulse transmission system of claim 40, wherein a received signal quality measurement is a function of at least one of a:

Signal strength,

Bit-error-rate,

Signal-to-noise ratio; and

Spectral property of the received signal.

42. The impulse transmission system of claim 40, wherein at least one time delay is inserted when a selected received signal quality measurement falls below a threshold.

43. The impulse transmission system of claim 40, wherein at least one time delay is periodically inserted between two adjacent pulse trains to satisfy the received signal quality criterion.

44. A multiple access system for transmitting and receiving a plurality of time-varied signals, comprising:

a Transmitter; and

a Receiver;

wherein said Transmitter generates a plurality of time-varied signals, and inserts a time delay specified by at least one code element of at least one delay code between two time-varied signals of said plurality of time-varied signals.

45. The multiple access system of claim 44, wherein time-varied signals consists of:

time-hopping signals;

frequency hopping signals;

time-division multiple access signals;

time-division code-division multiple access signals; and

orthogonal frequency division multiple access signals.

46. The multiple access system of claim 44, wherein a characteristic of a plurality of time-varied signals is varied in accordance with a time-varying code.

47. The multiple access system of claim 46, wherein said time-varying code specifies a characteristic of the plurality of time-varied signals within a time-varying code period.

48. The multiple access system of claim 47, wherein a delay code comprises one or more code elements that specify time delays inserted between:

two time-varying code periods;

two delay code periods, and

two nested delay code periods.

49. The multiple access system of claim 44, wherein:

said Receiver measures a received signal quality for a plurality of time-varied signals based on the time delays and

selects a received signal quality measurement that satisfies a received signal quality criterion; and

said Transmitter delays a time-varied signal by an amount of time equal to a sum of time delays that satisfies the received signal quality criterion.

50. The multiple access system of claim 49, wherein the received signal quality measurement is a function of at least one of a:

Signal strength,

Bit-error-rate,

Signal-to-noise ratio; and

Spectral property of the received signal.

51. The multiple access system of claim 49, wherein at least one time delay is inserted when a selected received signal quality measurement falls below a threshold.

52. The multiple access system of claim 49, wherein at least one time delay is periodically inserted between two adjacent pulse trains to satisfy the received signal quality criterion.